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Position and Development of Lübeck, rendered familiar the region in which the meeting was convening.

The geographic exhibit further contained objects relating to navigation, surveying and terrestrial magnetism, consisting of instruments, charts and books, the ethnological collections of the Lübeck Mpwangwe expedition, referred to above in connection with the paper on that subject, and a small but interesting exhibit illustrating the methods of teaching geography in secondary schools. Several map publishers had also sent samples of their wall maps, school geographies and atlases.

The meeting was followed by various excursions, most of which afforded an opportunity for the study of moraine topography. The main excursion, lasting three days, had eastern Schleswig-Holstein for its field, while three single day excursions included a visit to the region immediately to the south of Lübeck, a trip down the Trave by boat and the demonstration of the use of oceanographic instruments on board a surveying steamer.

The XVIIth meeting of German Geographers can, therefore, worthily rank with its predecessors as truly representative of the German geographic thought of the day. The next meeting would ordinarily take place two years hence, but, in order to avoid conflicting with the International Geographic Congress, it will be held in 1912 at Innsbruck.

GEOGRAPHICAL RECORD.

AMERICA.

THE SOCIETY'S EDUCATIONAL COLLECTION.—The wall maps, atlases, and text-books, representative of many of the best appliances used for geographical education in Europe, which were collected last year by the American Geographical Society, are now on exhibition in the University summer schools of the middle West. The exhibition opened at the University of Wisconsin on April 15, University of Minnesota on June 4, and Ohio State University on June 21. The later exhibitions will open at the University of Chicago, July 15; Denison University, Granville, Ohio, Sept. 15; University of Cincinnati, Oct. 15; State Normal School of Michigan, Ypsilanti, Nov. 24; and the University of Michigan, Dec. 1. The University of California and Leland Stanford Junior University have secured the collection for dates not yet assigned, and when it goes to the Pacific Coast it will probably remain there for some time. Not a few teachers think that the collection will be especially helpful in the Normal Schools and it is expected that many of them will exhibit it. The material is loaned to any educational institution that desires it.

ALASKAN GLACIERS.—The National Geographic Society has sent out a party to spend July, August and September in the study of the glaciers of southeastern Alaska. The party is headed by Professors Ralph S. Tarr of Cornell and Lawrence Martin of the University of Wisconsin. It sailed from Seattle on June 24 and will go to Yakutat Bay, where Professor Tarr was engaged during the summers of 1905-6 in the service of the U. S. Geological Survey, Professor Martin being enabled, by a grant of money from the American Geographical Society, to share in the work of 1905 as special assistant in physiography. The explorers published the results of their studies of the glaciers and glaciation of Yakutat Bay in the *Bulletin* of this Society (Vol. XXXVIII, 1906, pp. 145-167).

One of the leading purposes of the present expedition is to investigate the changes that may have been brought about in the glaciers of that region by the earthquake of 1899. In August, 1905, the explorers walked over the smooth and practically uncrevassed surface of these glaciers, but in 1906 the smooth surfaces were replaced by a sea of crevasses over which travel was practically impossible. The only explanation that has been assigned to this change is that "during the earthquakes of September, 1899, vast quantities of snow, ice and stone were avalanched down upon the reservoirs of the glaciers, giving such a sudden addition to the glacier supply that a wave of advance was started which, sweeping rapidly down the glaciers, broke the rigid, stagnant mass into a maze of crevasses and sérac—a veritable glacier flood."

If the work in Yakutat Bay is finished in time, the party will go to Prince William Sound to study and map the larger glaciers of that region, notably those in the Port Wells Inlet. Mr. W. B. Lewis of the U. S. Geological Survey has gone with the expedition as topographer, and Mr. O. D. von Engeln, of Cornell, as photographer.

THE COAL FIELDS OF ALBERTA.—The Resource Map of Canada, recently published by the Interior Department, covers a large part of the Alberta province with a symbol indicating the vast extent of the Alberta coal fields. These fields, the most extensive in Canada, are described in a paper, "The Coal Fields of Alberta," by D. B. Dowling, published in *Economic Geology,* (No. 1, 1909). He divides them into three formations, the Kootanie, the Belly River and the Edmonton. The Kootanie measures, as far as now known to be exposed in Alberta (the Crow's Nest area is not included in the estimate), have an area of 288 square miles and an estimated coal content of 7,930,000,000 tons. This is mostly bituminous in character, but a small fraction, 400,000,000 tons, can be classed as anthracite. In the Belly River formation, the area over which a workable seam may be found can hardly be estimated, but as the formation is exposed over an area of about 25,000 square miles, one-fourth, or about 6,000 square miles, may be assumed as valuable. This, with four feet of coal, represents the very large amount of 26,000,000,000 tons of coal ranging from lignitic to bituminous. The area over which the Edmonton formation has been traced is enormous and the neighbourhood of Edmonton is almost a continuous coal field. Its area in the foothills is estimated at 2,000 square miles and on the prairies at about 10,800 square miles; and the estimate of total content, based upon exposures, is 71,000,000,000 tons ranging from lignite to lignitic coal. Settlers are rapidly pushing into these widespread areas and opening farms and ranches. The Canadian Northern and Grand Trunk Pacific railroads have now entered the Alberta coal fields, and the Canadian Pacific crosses the southern part of the area.

AFRICA.

MOUNT CAMEROONS IN ERUPTION.—Reports reached Europe in May that in the last days of April and early in May Mount Cameroons was observed to be in eruption. Unmistakable signs of activity were seen at 7 P. M. on April 29, when the clouds above the northwest side of the mountain glowed with the light, volcanic bombs, hurled into the air, fell back upon the mountain and a flow of lava was distinctly observed. The eruptions continued for several days, and were quite violent at first, but feebler towards the last. Stone houses at Buea were badly damaged and the seat of government will probably be removed from that place. The plantations sustained no important loss.

Mount Cameroons thus disappears from the list of extinct volcanoes, confirming the investigations of Dr. Hassert, who explored the upper regions of the mountain from Oct. 22 to Dec. 2, 1907 (*Bull.,* 1908, p. 471). The view was long held that Cameroons, for centuries, had been an extinct volcano. But Hassert found, northeast of the highest point of the mountain, a crater ("Mount Robert Meyer Crater") that was still in the solfataric stage. He saw issuing from it a slender column of smoke and observed a very strong smell of sulphur. The natives had long told the whites that their fathers, a half century ago, had seen smoke issuing from the mountain, but this report was discredited.

AN AUTOMOBILE IN THE ANGLO-EGYPTIAN SUDAN.—A despatch to the London *Times* says that Captain Kelly has completed the first trip in an automobile from Khartum to Kassala, on the edge of Eritrea, and back. The distance between the two places is 255 miles. The journey out occupied four days and the return trip, two. The road across this partly desert region has been under construction for three years, wells being sunk and *khors* (water courses) filled.

THE RÉGIME OF THE UPPER NILE WATERS.—In his paper on "Fifty Years of Nile Exploration and some of its Results" (*Geog. Journ.,* Feb., 1909), Sir William Garstin told how the annual rise of the Nile is produced and how its supply is maintained throughout the year. In April and May nearly all the water passing Khartum is derived from Lake Albert, as the Bahr-el-Gebel feeder of the White Nile is almost dry and the discharges of the Blue Nile and the Sobat are very small. In June the Abyssinian rainfall begins to fill the Blue Nile and the Sobat discharge into the White Nile commences to swell. Both these rivers continue to rise and their flood is at maximum in August; at this time, also, the Atbara is in full flood, making a large addition to the volume of the Nile north of Khartum.

The following remarkable facts have not been understood: As the Sobat rises, its large flood holds back the smaller stream of the White Nile and the whole volume of water coming from the equatorial lakes is thus impounded in the valley above the Sobat junction. Then in August, the Blue Nile is in full flood with a volume several times as large as that brought down from the Sobat by the White Nile channel. The Blue Nile now begins to play exactly the part that the Sobat has enacted, though on a vastly larger scale. Its great flood entirely holds back the waters of the White Nile which are impounded in an immense reservoir that floods the White Nile valley for 200 miles. In September, usually, the Blue Nile begins to fall and as its discharge decreases the imprisoned waters of the White Nile are set free and begin to flow north. The quantity of the stored up water is so enormous that the discharge of the White Nile at

Khartum steadily increases till the end of the year. The waters of the more southern reservoir, formed when the Sobat was at flood, come on to swell the volume and during the early winter months the quantity of water that is passing Khartum is actually greater than that which Lake Albert is sending down the river. Thus these rivers automatically compensate one another so that, at the time when one system is passing on a large volume of water, the other is storing up its discharge, and, when the former begins to decrease in volume, the stored water takes its place and makes good the deficiency.

POLAR.

COAL FOR PEARY.—Captain Samuel W. Bartlett of Brigus, N. F., and Mr. Herbert L. Bridgman, Secretary of the Peary Arctic Club, purchased and equipped, in July, the schooner *Jeanie,* of Bay Roberts, N. F., for a voyage to Etah, Peary's base station in Greenland, near Smith Sound. She was expected to sail, under command of Captain Bartlett, from St. John's, N. F., with a load of coal to be deposited at Etah for Peary's exploring vessel *Roosevelt* when she comes south from her winter quarters on her homeward voyage. This event is probably contingent upon the success of Peary's effort to reach the North Pole last spring. If he failed to carry out his plan, early this year, he is expected to make another attempt next spring. Captain Bartlett, on his homeward voyage, expects to bring with him Mr. Harry Whitney, of New Haven, Conn., who went to the Smith Sound region on the *Erik,* last year, and remained during the winter for musk-ox shooting. The Dr. Frederick A. Cook Relief Committee of the Arctic and Explorers' Clubs, having ceased its efforts to raise money to buy a ship, turned over the funds collected to Bartlett and Bridgman and the *Jeanie* expedition will endeavour to bring Dr. Cook home. Calls northbound will be made at Godhavn and Upernavik and Cape York, and returning the course will be on the western side of Baffin's Bay, with calls at the whaling stations in Baffin Land and on Hudson Strait, with the possibility, however, that all plans may be changed by meeting the *Roosevelt,* in which case Commander Peary would assume authority over both ships.

The *Jeanie* will be the only vessel, as far as is known, from America to enter Melville Bay and Smith Sound this season; and only one whaler, *The Morning,* Captain Adams, has gone from Dundee, Scotland.

PHYSICAL GEOGRAPHY.

EFFECT OF ATMOSPHERIC PRESSURE UPON THE EARTH'S SURFACE.—"The Effect of Atmospheric Pressure upon the Earth's Surface" is the title of an interesting paper by F. Napier Denison, in the *Journal of the Royal Astronomical Society of Canada* for November-December, 1908. Mr. Denison is the observer of the Canadian Meteorological Service at Victoria, B. C., and since 1899 has been studying the records obtained on a Milne seismograph in relation to the disturbing effects of areas of low and high pressure, tides, rain and snowfall, temperature changes, etc. In an earlier paper, read before the Royal Meteorological Society (London) in June, 1901, the same writer gave a preliminary discussion of this subject. The results of the present study are, briefly, as follows:

At Victoria, at the southern end of Vancouver Island, the movements of the pendulums demonstrate a tilting of the earth's surface in the direction where the pressure of the atmosphere is greatest. The pendulums often commence and continue swinging in a certain direction hours, and sometimes more than a day, before the barometers along the Pacific coast indicate the approach of great cyclonic or anticyclonic areas from the ocean. The seismograph thus acts as a barometer which is more sensitive than the ordinary mercurial barometer. The pendulum movements are greatest during the stormy months of winter and least throughout the summer, when the changes of pressure are small along the Pacific slope. To arrive at the true connection between pendulum movements and changes of air pressure, the latter must be studied with charts covering areas of from 1,000 to 2,000 miles in extent, otherwise local atmospheric conditions may appear to cause a tilting effect contrary to that indicated by the pendulums. The loading of the Pacific coast during the winter months with heavy rains on the lower land and great quantities of snow upon the great mountain ranges of the interior may account for a small proportion of the easterly tilting. The curves under discussion clearly demonstrate that pronounced westerly tiltings occur during the winter months, when vast areas of high pressure are to the westward of the station. A careful examination of the east-west Milne record shows that the diurnal movement is found to be well marked upon fine days and either absent, or nearly so, during overcast or rainy weather. The loading effect upon the coast resulting from tidal action is noticeable upon the records chiefly during the summer months, and only when slight differences of barometric pressure prevail; also only when extreme tides occur. During unsettled weather, when great differences of air pressure are taking place over the Pacific slope, the tidal effect upon the pendulum is completely masked by the greater deflecting force.

R. DeC. W.

PILOT CHART OF THE SOUTH ATLANTIC OCEAN.—The U. S. Hydrographic Office announced a year or more ago that there would soon be issued a "Pilot Chart of the South Atlantic Ocean," similar to the already well-known charts of the North Atlantic and North Pacific Oceans. The first number of this new chart is that for June, July and August, 1909. Its publication is to be welcomed both because of the special meteorological interest which attaches to the South Atlantic, and, further, because the increasing attention which is being paid to things South American will naturally also extend to the meteorological and climatic conditions which prevail along the coasts, and over the oceans crossed by steamers and sailing vessels going to and from South America. The general plan of this chart is similar to that of the North Atlantic and North Pacific charts. The information in red presents past or existing facts (derelicts and wrecks, icebergs and field ice, drifting buoys, ocean currents, magnetic variation, limiting line of ice region); the information in blue represents expected and average conditions of wind and weather (prevailing winds and calms), based on past averages, and recommended routes for steam and sail. There is a discussion of the passage of the Strait of Le Maire. Those who study this South Atlantic chart regularly, year after year, from now on, will be interested in seeing how the gradual accumulation of meteorological data for the "squares" south of latitude 45° and between longitudes 50° W. and 35° E. will result in filling up the blank space which now appears over this portion of the ocean on the first issue of the chart. The development of the North Atlantic Chart from its first crude and incomplete form, twenty-five years ago, has been very interesting to watch. R. DeC. W.

CHANGES OF CLIMATE IN TURKESTAN.—Dr. A. Woeikof, in the *Meteorologische Zeitschrift* (Vol. XXV, pp. 567-568), gives, briefly and emphatically, a few statements in connection with some recently expressed opinions that there is a progressive desiccation in Turkestan. He shows that during the past fifteen years lakes there are gradually and generally increasing in size, over a wide area. Woeikof concludes that there are very marked fluctuations in the rainfall and water levels in Turkestan, but whether periodic or irregular does not yet appear. If periodic, the period is longer than that of the Brückner cycle. There is absolutely no evidence of a steady progressive drying-up of Turkestan, in Woeikof's opinion. The evidence of a former greater extension of the rivers and lakes probably belongs to a period which corresponds to the last glacial epoch in Europe. General glaciers have disappeared from Europe; in Turkestan there has been complete desiccation of some lakes, while others have become smaller. Further, there have been climatic oscillations since then, but nothing shows that there is anywhere on the earth's surface a permanent, progressive (*i. e.*, lasting several thousands of years) change of rainfall, or of water levels. R. DEC. W.

GLACIATION OF THE UINTA AND WASATCH MOUNTAINS.—In Professional Paper No. 61 of the U. S. Geological Survey (1909), W. W. Atwood describes in detail the glacial phenomena of the Uinta and Wasatch ranges. During the period of maximum extension of the glaciers, the total area covered by ice exceeded 1,000 square miles and only lofty peaks and narrow, rugged divides rose above it. There were altogether 30 distinct glaciers, the longest 27½ miles in length, and some of the largest reached beyond the mountains into the lower country to the north and south. The larger glaciers were really systems of glaciers with one or more tributaries, and counting these tributaries there were 104 glaciers of over a mile in length. In the Wasatch mountains there were at least 50 glaciers exceeding a mile in length, seven of which reached the shore line of Lake Bonneville. Dr. Atwood finds convincing evidence of two glacial epochs separated by a long interglacial interval. The glacial phenomena of the two mountain ranges are described in detail and illustrated by photographs and maps.

Like other students of glacial phenomena in recent years, Dr. Atwood sees clearly the striking evidence of profound modification of the mountain topography by the glaciers. His view on this subject is indicated by the following quotations:

"While the ice responded to topography and in large measure was controlled by the physical features of the range, yet at the same time it was modifying the forms encountered, changing the shape of the great canyons, and building new forms * * *

"Before the first Pleistocene snows fell on the Uinta Mountains, the heads of the great canyons, it may be fairly assumed, were narrow V-shaped notches, most of which reached nearly to the crest line of the range. The first ice was formed in these narrow canyon heads, and the earliest movement must have been down canyon. As the ice at the heads of the canyons increased in thickness, there came to be a notable movement down the sides of the gorges, concentrating the ice in the canyons and causing further movement downstream. With the movement of the ice on the slopes in these miniature catchment basins loose *débris* was carried downward and the basins were both widened and lengthened. About the margin of these early ice fields, weathering and ice plucking were in progress, such work as is going on to-day at the base of the Bergschrund. In this way the catchment areas were increased in size and changed to cirque-like forms. * * Coincident with the widening of the basin there was a narrowing of the divides between the heads of the canyons and a narrowing of the main crest of the range. Some of the divides were so reduced in width that it is dangerous to try to walk along them. Others were surmounted and greatly reduced in height by the ice. The main crest line was sharpened, and the peaks were made more prominent.

"In the canyons the great change * * was the development of broad U-shaped troughs. The preglacial forms were obliterated. The canyons were widened and deepened. In this process many tributaries were left as hanging valleys, with their lower ends several hundred feet above the main stream. The canyon walls were smoothed off as far up as the ice rested. Preglacial erosion lines and the asperities common to the slopes of unglaciated canyons were rubbed off. In the bottom of the gorges, on the canyon walls, and in the basins, the glaciers built up new topographic forms. They added to the physical features of the range numerous morainic ridges and many square miles of hummocky or rolling drift topography."

In the report many specific instances of these phenomena are described and illustrated, thus making one more important contribution to the literature which is firmly establishing the efficiency of ice as an agent of profound erosion.

R. S. T.

A NEW ZEALAND VOLCANO.—A letter to the London *Times* says that the Ngauruhoe volcano, in the volcanic region of the North Island, New Zealand, was on March 8 in eruption after quiescence for a year. A quivering of the earth near the volcano was felt in the evening and loud noises were heard. These phenomena were followed by the ejection of a column of steam and later by larger quantities of steam and volcanic ash. The eruption was apparently caused by the blocking of the main vent which was cleared by an outburst of superheated steam. There was no lava flow. Ngauruhoe is a symmetrical cone, 7,515 feet high, snow-covered and one of the four peaks in the Taupo district that still show signs of activity.

VARIOUS.

A NEW GEOGRAPHICAL PUBLICATION.—The Society has received the first two numbers of the *Izviestia* (Bulletin) of the Archangel Society for the Study of Northern Russia. The initial numbers of the publication, which will appear semi-monthly, contain several papers on the geography and development of northern Russia whose titles will be printed in "Current Geographical Papers." Mr. V. Lengauer is the editor and Mr. A. S. Chidlowsky is President of the Society, whose aim will be to promote a more detailed exploration of all parts of North Russia and to encourage and record the commercial and other phases of its development.